APPENDIX F

Summary of Monitoring Programs Outside the Parks and Programs of Interest to the Eastern Rivers and Mountains Network Inventory and Monitoring Program

The following list includes national, state and university-level organizations with monitoring programs in the region of the Eastern Rivers and Mountains Network or who may be useful for future potential collaborations (for inventory, monitoring or bioindicator development). More details on protocols, closest monitoring stations and contact information will be developed as the ERMN program develops and potential collaborators are identified. Where applicable, the name of the program is listed with the name of the lead agency or state the program is found in. Otherwise, the name of the agency/organization is listed with appropriate information.

WATER RESOURCES

National

- **Environmental Monitoring and Assessment Program (EPA) –** The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources. EMAP aims to demonstrate multi-agency monitoring through large regional projects. The MAIA portion of the program concentrates on the Mid-Atlantic area. The program has a wide range of short and long-term monitoring programs that cover water quality and streams assessment, including the National Stream Survey and the Streams Assessment Program.
  Parks Involved: All

- **Ground Water Climate Response Network (USGS)** - The USGS maintains a network of wells to monitor the effects of droughts and other climate variability on ground-water levels. The network consists of a national network of about 150 wells monitored as part of the Ground Water Resources Program, supplemented by wells in some States monitored as part of the Cooperative Water Program. There are 64 sites in Pennsylvania and 3 sites in West Virginia that collect ground-water levels.
  Parks involved: All

- **National Water Quality Assessment Program (USGS)** - In more than 50 major river basins and aquifers covering nearly all 50 states, USGS scientists collect and interpret data about water chemistry, hydrology, land use, stream habitat, and aquatic life. The goal is to develop long-term consistent and comparable information on streams, ground water, and aquatic ecosystems to support sound management and policy decisions. The NAWQA program is designed to answer these questions: What is the condition of our nation's streams and ground water? How are these conditions changing over time? How do natural features and human activities affect these conditions? These studies are designed to be long-term and cyclical, so that changes can be detected over time.
  Parks involved: All

- **Atlantic Slope Consortium (EPA)** - The goal of the Atlantic Slope Consortium (ASC) is to develop and test a set of indicators in freshwater and coastal systems that are ecologically appropriate, economically reasonable, and relevant to society. Specific objectives, as presented in the original proposed scope of work, included: (1) develop and test ecological

and socioeconomic indicators of aquatic resource condition, construct models that use environmental, geographic, and stressor data to predict indicator responses, and use models to link upstream watersheds and downstream estuaries; (2) develop large scale measures for characterizing landscape attributes and land-use patterns to serve as predictors of a range of environmental conditions; and (3) deliver a nested suite of indicators to managers, where the implications of aggregating models at various scales are considered, and for which reliability is known.
Parks involved: DEWA and UPDE

• **Freshwater Initiative (The Nature Conservancy) -** The Nature Conservancy's Freshwater Initiative is working to counter two of the most insidious threats to freshwater ecosystems: ecologically incompatible water management and unsustainable agricultural practices.
Parks involved: ALL

• **Oak Ridge National Laboratory -** Biological indicators have been developed and applied at a variety of field sites in the eastern United States to assess and evaluate the effects that environmental stressors such as contaminants have on the health of aquatic organisms, populations, and communities.
Parks involved: ALL

State

• **Statewide Surface Water Assessment (PA DEP)** – started in 1997, and expected to be complete by 2007. Developed to assess all 83,000 miles of streams in the state. Assessments are based on the instream habitat and macroinvertebrate community composition.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA

• **Surface Water Quality Monitoring Network (PA DEP)** – Biological samples are collected at 26 fixed stations three times a year and once a year at 123 additional stations using Rapid Bioassessment Protocols (EPA). These data, in conjunction with bimonthly water chemistry samples, are used to monitor long-term trends in water quality on the major streams in the state.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA

• **Watershed Assessment Program (WV DEP)** – program was implemented in 1996 to measure the water quality and biological health of the state's streams.

• **Northeastern Research Station/Parsons (WV) Research Lab (USFS)** – Collecting hydrologic and meteorological data on seven watersheds in the region since the 1950's.
Parks involved: NERI, GARI and BLUE

• **Plateau Action Network (WV)** – Initiated bimonthly monitoring of Wolf Creek (NERI) watershed to determine levels of AMD, metals deposition and fecal coliform levels. They are currently working on remediation of the Wolf Creek coal gob pile.
Parks involved: NERI

- **West Virginia Watershed Network (WV)** – informal association of agencies and organizations that collaborate to support efforts and provide resources so local residents can successfully manage water resources. No monitoring (?).
Parks involved: NERI, GARI and BLUE

- **Vernal Pool Mapping (NJ ENSP)** – In an agreement with Rutgers University, all potential vernal pools within the state are mapped by satellite imagery and then verified by staff and volunteers with NJ ENSP. Any vernal pool that is certified by the agency is afforded protection from development.
Parks involved: DEWA

- **Stream Biomonitoring Unit (NYSDEC)** – Since 1972, this unit has been using macroinvertebrates to monitor the quality of streams in New York.
Parks involved: UPDE

- **Stoneycreek-Conemaugh River Improvement Project (PA) –** concentrates primarily on AMD projects within the watershed, and uses volunteers to monitor aquatic resources in those areas.
Parks involved: JOFL and ALPO

- **Delaware RiverKeeper Network** – Works throughout the Delaware River Watershed and includes a volunteer monitoring program that collects primarily chemical water quality parameters at many sites along the Delaware River and tributaries.
Parks involved: DEWA and UPDE

University

- **The Alliance for Aquatic Resource Monitoring –** Dickinson College database containing more than 33,466 records on water quality from 1986 to the present from 622 testing sites throughout Pennsylvania.
Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

AIR QUALITY

National

- **Clean Air Act Status and Trends Network** (CASTNet/formerly the National Dry Deposition Network) - provides atmospheric data on the dry deposition component of total acid deposition, ground-level ozone and other forms of atmospheric pollution.
Parks involved: ALL

- **National Atmospheric Deposition Program/National Trends Network** - The purpose of the network is to collect data on the chemistry of precipitation for monitoring of geographical and temporal long-term trends. The precipitation at each station is collected weekly and analyzed for hydrogen (acidity as pH), sulfate, nitrate, ammonium, chloride, and base cations (such as calcium, magnesium, potassium and sodium).
Parks involved: ALL

- **National Atmospheric Deposition Program/Atmospheric Integrated Monitoring Network** Whereas the National Trends Network was designed to characterize long-term trends in the chemical climate of the U.S., AIRMoN was designed to provide data with a greater temporal resolution. This short-term resolution is critical for; 1) determining the effectiveness of emission controls mandated by the Clean Air Act; 2) evaluating the potential impacts of new sources of emissions on protected areas such as Class I Wilderness Areas; and 3) identifying source/receptor relationships in atmospheric models.
Parks involved: ALL

- **National Atmospheric Deposition Program/Mercury Deposition Network -** The objective of the MDN is to develop a national database of weekly concentrations of total mercury in precipitation and the seasonal and annual flux of total mercury in wet deposition.
Parks involved: ALL

- **National Acid Precipitation Assessment Program (NOAA) -** The National Acid Precipitation Assessment Program (NAPAP) is an interagency scientific research, monitoring and assessment program on the effects of sulfur and nitrogen oxides on the environment and human health. NAPAP acts as a coordinating office between six Federal agencies, which also fosters cooperation among its members, other governments, States, universities, and the private sector.
Parks involved: ALL

State

- **Delaware River Basin Collaborative Environmental Monitoring and Research Initiative (USFS, USGS and NPS)** – A collaboration of existing monitoring programs in the region (FIA, FHA, NAWQA and the NTN Deposition Program) to link air quality, hydrological and forestry information across the landscape of the Delaware River Basin. Intensive research sites include the Delaware Water Gap NRA, French Creek State Park and Neversink River Basin in the Catskills. Issue-based studies include such topics as 1) Causes, consequences, and regional extent of calcium depletion in the forests of the Appalachian Plateau. 2) Protocols for Identification and Monitoring of Forests Vulnerable to Non-native Invasive Pests 3) Forest Fragmentation and associated ecosystem changes in the Delaware River Basin.
Parks involved: DEWA and UPDE

- **Northeast States for Coordinated Air Use Management** - NESCAUM's purpose is to exchange technical information, and to promote cooperation and coordination of technical and policy issues regarding air quality control among the member states. To accomplish this, NESCAUM sponsors air quality training programs, participates in national debates, assists in exchange of information, and promotes research initiatives.

CLIMATE

National

- **Environmental Monitoring and Assessment Program (EPA) –** The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources. EMAP aims to demonstrate multi-agency monitoring through large regional projects. The MAIA portion of the program concentrates on the Mid-Atlantic area. Projects include a focus on climate change within the region.
  Parks involved: ALL

- **Northern Global Change Research Program (USFS) -** The Forest Service goal for global change research is to establish a sound scientific basis for making regional, national, and international resource management and policy decisions in the context of global change issues. The objectives of the Northern Global Change Program (NGCRP) are to understand: (1) what processes in forest ecosystems are sensitive to physical and chemical changes in the atmosphere, (2) how future physical and chemical climate changes will influence the structure, function, and productivity of forest and related ecosystems, and to what extent forest ecosystems will change in response to atmospheric changes, and (3) what are the implications for forest management and how must forest management activities be altered to sustain forest productivity, health, and diversity.
  Parks involved: ALL

- **UV-B Monitoring and Research Program (USDA)** – purpose is to provide information on the geographical distribution and temporal trends of UVB (ultraviolet -B) radiation in the United States. This information is critical to the assessment of the potential impacts of increasing ultraviolet radiation levels on agricultural crops and forests. Specifically the monitoring program: 1) provides information to the agricultural community and others about the climatological and geographical distribution of UVB irradiance; 2) Furnishes the basic information necessary to support evaluations of the potential damage effects of UVB to agricultural crops and forests; 3) Supplies ground truth for satellite measurements and basic information for radiation transfer model calculations; 4) Establishes long-term records of UVB irradiance necessary to assess trends.
  Parks involved: ALL

State

- **Northeastern Research Station/Parsons (WV) Timber and Watershed Research Lab (USFS)** – Collecting hydrologic and meteorological data on seven watersheds within Fernow Experimental Forest since the 1950's.
  Parks involved: NERI, GARI and BLUE

TOXINS

National

- **Biomonitoring of Environmental Status and Trends Program/ National Contaminant Biomonitoring Network (USGS/USFWS)** – determines the national status and trends of organochlorines and pesticides in the European starling, primarily on DOI lands.
  Parks involved: ALL

FOREST HEALTH

National

- **Forest Inventory and Analysis (USDA Forest Service)** - FIA reports on the status and trends in forest area and location; in the species, size, and health of trees; in total tree growth, mortality, and removals by harvest; in wood production and utilization rates by various products; and in forest land ownership. The enhanced FIA program (formerly the FHM program) will include information relating to tree crown condition, lichen community composition, soils, ozone indicator plants, complete vegetative diversity, and coarse woody debris. The program is managed by the Research and Development organization within the USDA Forest Service in cooperation with State and Private Forestry and National Forest Systems. FIA has been in operation under various names (Forest Survey, Forest Inventory and Analysis) for some 70 years. The program covers forests on all forest lands within the US. The program is implemented in cooperation with a variety of partners including State forestry agencies and private landowners who grant access to their lands for data collection purposes.
  Parks involved: ALL

- **Forest Health Protection Program** (**USDA Forest Service - Morgantown Field Office)** - The Forest Health Protection staff of the Morgantown Field Office provides technical and financial assistance in an effort to protect trees and forests from insect and disease problems. This assistance is provided to all Federal forest land managers within the mid-Atlantic states (New Jersey, Delaware, Maryland, Ohio, Pennsylvania, West Virginia, and the District of Columbia). Specialists work through the State Foresters' office or the State Department of Agriculture within these states to provide forest health assistance to nonfederal forest landowners.
  Parks involved: ALL

State

- **Delaware River Basin Collaborative Environmental Monitoring and Research Initiative (USFS, USGS and NPS)** – A collaboration of existing monitoring programs in the region (FIA, FHA, NAWQA and the NTN Deposition Program) to link air quality, hydrological and forestry information across the landscape of the Delaware River Basin. Intensive research sites include the Delaware Water Gap NRA, French Creek State Park and Neversink River Basin in the Catskills. Issue-based studies include such topics as 1) Causes, consequences, and regional extent of calcium depletion in the forests of the Appalachian Plateau. 2) Protocols for Identification and Monitoring of Forests Vulnerable to Non-native Invasive Pests 3) Forest Fragmentation and associated ecosystem changes in the Delaware River Basin.
  Parks involved: DEWA and UPDE

• **Pennsylvania Bureau of Forestry** - The Forest Health Section is responsible for monitoring biotic and abiotic factors that affect forest health. Various projects are implemented for the prevention, detection, diagnosis, investigation, and evaluation of forest pest problems. These include coordinating annual forest pest surveillance flights over all forestland in the state, providing management recommendations to develop pest-resistant stands, conducting forest pest damage appraisals, training field personnel, curation of a reference collection of forest pest specimens and/or damage, maintaining a storage and retrieval database for pest occurrence records, and the acquisition or preparation of informational materials on forest pests. A forest health report for the Commonwealth is published each year.
Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

• **Northeastern Forest Experiment Station (USDA FS, Morgantown, WV)** – The Research Work Unit of this station is to provide methods for creating and maintaining healthy, sustainable oak-dominate forests based on a more complete understanding of ecological relationships, landscape ecology principles, silvicultural management, and gypsy moth population dynamics, and to incorporate this knowledge into management guidelines and decision support systems. Four problems assigned to this unit are: (1) the lack of information and understanding of the ways in which defoliation by gypsy moth and other established exotic organisms interact with other forms of disturbance in influencing forest dynamics, successional patterns and other ecological processes, (2) an incomplete understanding of the population dynamics of the gypsy moth and other introduced pests, especially at landscape scales, and this may lead to inappropriate management decisions, (3) to develop biologically- and economically-effective silvicultural treatments for rehabilitating and regenerating oak forests, and (4) to develop models and other decision support tools that synthesize and integrate results from studies of disturbance effects and dynamics.
Parks involved: ALL

• **Northeastern Forest Experiment Station (USFS, Warren, PA)** – Among the research projects at this station are a 10-year study on the effects of deer densities on the sustainability of eastern forests.
Parks involved: ALL

• **Northeastern Forest Experiment Station (USFS, Durham, NH)** – Recently completed a long-term study on the effects of nitrogen pollution on forested ecosystems.
Parks involved: ALL

• **Forest Health Protection Program** (**USDA Forest Service - Morgantown Field Office)** - The Forest Health Protection staff of the Morgantown Field Office provides technical and financial assistance in an effort to protect trees and forests from insect and disease problems. This assistance is provided to all Federal forest land managers within the mid-Atlantic states (New Jersey, Delaware, Maryland, Ohio, Pennsylvania, West Virginia, and the District of Columbia). Specialists work through the State Foresters' office or the State Department of Agriculture within these states to provide forest health assistance to nonfederal forest landowners.

Parks involved: ALL

INVASIVE SPECIES

National

- **Aquatic Nuisance Species Task Force (USFWS and NOAA) -** An intergovernmental organization dedicated to preventing and controlling aquatic nuisance species, and implementing the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990. The various NANPCA mandates were expanded later with the passage of the National Invasive Species Act (NISA) in 1996. The core elements are prevention, detection and monitoring, and control. Prevention activities relate to identifying and modifying pathways by which nonindigenous aquatic species can be introduced and spread. Efforts to detect and monitor nonindigenous species are being coordinated by a National Nonindigenous Aquatic Nuisance Species Information Center. The Task Force is also responsible for recommending initiation of control programs.
  Parks involved:

State/Regional

- **Zebra Mussel Monitoring (PA DEP)** – Monitoring program that began in 1991 to monitor the spread of the zebra mussel in lakes, reservoirs and rivers.
  Parks involved: DEWA, UPDE

- **Delaware River Invasive Plants Partnership (DRIPP) (NPS)** – Although this program is technically a part of the park service, is encompasses the entire Delaware River Watershed. The goal of the program is to control invasive species within the Delaware River Watershed.
  Parks involved: DEWA, UPDE

BIRDS

National

- **North American Breeding Bird Survey (USGS)** – The BBS was designed to provide a continent-wide perspective of population change. Routes are randomly located in order to sample habitats that are representative of the entire region. Other requirements such as consistent methodology and observer expertise, visiting the same stops each year, and conducting surveys under suitable weather conditions are necessary to produce comparable data over time. A large sample size, (number of routes), is needed to average local variations and reduce the effects of sampling error, (variation in counts attributable to both sampling technique and real variation in trends).
  Parks involved: ALL

- **Audubon Christmas Bird Count -** The National Audubon Society Christmas Bird Count (CBC) is an early-winter survey of birds. Although counts occur in Central and South America, most CBCs occur in North America. The sample area for a count is a circle that is

15 miles in diameter, and varying numbers of volunteers count all birds they see in the circle during a single day, which is within 2 weeks of 25 December.
Parks involved: ALL

• **Partners in Flight** – The goal of PIF landbird conservation planning and the Bird Conservation Plans (BCPs) is to ensure long-term maintenance of healthy populations of native landbirds. These documents were prepared to facilitate that goal by stimulating a proactive approach to landbird conservation. The BCPs primarily address nongame landbirds, many of which are exhibiting significant declines that may be arrested or reversed if appropriate management actions are taken. The PIF approach differs from many existing federal and state-level listing processes in that it (1) is voluntary and nonregulatory, and (2) focuses proactively on relatively common species in areas where conservation actions can be most effective, rather than the frequent local emphasis on rare and peripheral populations. PIF Bird Conservation Plans therefore provide the framework to develop and implement habitat conservation actions on the ground that may prevent the need for future species listings.
Parks involved: ALL

• **Environmental Assessment and Monitoring Program (EPA) –** The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources. EMAP aims to demonstrate multi-agency monitoring through large regional projects. The MAIA portion of the program concentrates on the Mid-Atlantic area. Projects include using bird communities as indices of biotic integrity within the region.
Parks involved: ALL

• **Atlantic Flyway Mid-Winter Waterfowl Survey (USFWS)** - the Midwinter Survey, provides information on population trends for some species, distribution on the wintering grounds, and habitat use.
Parks involved: ALL

• **Monitoring Avian Productivity and Survivorship (IBP and USFWS) -** provides demographic information such as young/adult ratios and adult survivorship for a variety of small land birds.
Parks involved: ALL

• **North American Bird Conservation Initiative (USFWS) –** The goal of this program is to deliver the full spectrum of bird conservation through regionally-based, ecologically-driven, landscape-oriented partnerships. All of the ERMN falls within the Appalachian Mountain Bird Conservation Region.
Parks involved: ALL

• **North American Waterbird Conservation Plan (USFWS) –** Focuses on waterbirds across the continent. Regional waterbird plans (ERMN is in the Southeast) are being developed.

Parks involved: ALL

• **North American Waterfowl Management Plan (USFWS) –** The NAWMP is an international action plan involving Canada, the United States and Mexico to conserve migratory birds throughout the continent. The Plan's goal is to return waterfowl populations to their 1970s levels by conserving wetland and upland habitat. The Plan's projects are international in scope, but implemented at regional levels. These projects contribute to the protection of habitat and wildlife species across the North American landscape.
Parks involved: ALL

• **Atlantic Coast Joint Venture (USFWS) –** a collaboration of the NA Waterfowl Management Plan, NA Waterbird Conservation Plan, Partners in Flight and the US Shorebird Conservation Plan.
Parks involved: ALL

State

• **Breeding Bird Atlas** – The Breeding Bird Atlas database indicates bird species and nesting behavior of known birds species in each state.
Parks involved: ALL

• **Grassland Breeding Bird Survey (PA Game Commission)** – Objectives of this program, which is modeled after the Breeding Bird Survey, is to monitor the status, trends and habitat associations of breeding grassland birds.
Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

• **Colonial Nesting Bird Survey (PA Game Commission)** – Objective is to inventory and monitor colonial waterbird populations in Pennsylvania.
Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

• **Bald Eagle Breeding and Wintering Surveys (PA Game Commission)** - The objectives of this project are to inventory and monitor bald eagle (*Haliaeetus leucocephalus*) breeding and wintering populations in Pennsylvania.
Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

• **Peregrine Falcon Investigations (PA Game Commission)** - The long-term management goal is to reestablish a self-sustaining peregrine falcon population in Pennsylvania.
Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

• **Osprey Nest Surveys (PA Game Commission)** - The purpose of this project is to inventory and monitor osprey nesting activities in Pennsylvania.
Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

• **Loggerhead Shrike Nesting Surveys (PA Game Commission)** - The objectives of this project are to monitor known loggerhead shrike (*Lanius ludovicianus*) nesting sites, to assess breeding activity, to search for new shrike territories, and to further enhance habitat for these birds.

Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

• **Louisiana Waterthrush Monitoring (PA Audubon Society)** – Louisiana waterthrush are used as an indicator of stream health throughout the state.
Parks involved: ALPO, JOFL, FRHI, FONE, DEWA, UPDE

• **Osprey Aerial Surveys (NYSDEC)** – Nests are monitored by staff by aerial surveys each summer.
Parks involved: UPDE

• **American Woodcock Survey (NYSDEC)** – annual surveys to determine the status of this species throughout the state.
Parks involved: UPDE

• **Mid-winter Bald Eagle Surveys (NYSDEC)** – aerial surveys of wintering populations of Bald Eagles, includes areas along the Delaware River.
Parks involved: UPDE

• **Northern Saw-Whet Owl Monitoring (WV DNR)** – A nestbox placement and monitoring program was initiated in 2002 at 65 sites. Eight routes were also establish to survey call responses.
Parks involved: NERI, GARI, BLUE

• **Point Count Survey Routes (WV DNR)** – Point count survey routes were established in 50 of the state's 55 counties. Many of the routes were designed to cover areas not already covered by the BBS, both in terms of habitat and location. Routes are expected to be permanent and surveyed yearly.
Parks involved: NERI, GARI, BLUE

• **Grassland Bird Conservation (NJ – agency?)**
A long-term monitoring and habitat management/conservation strategy will be developed to benefit endangered, threatened, special concern, and regional priority grassland-nesting birds including: grasshopper sparrow, vesper sparrow, bobolink, Henslow's sparrow, savannah sparrow, upland sandpiper, eastern meadowlark, and field sparrow.
Parks involved: DEWA

• **Migratory Bird Stopover Habitat (PA Game Commission and New Jersey Audubon)** - This project will develop land acquisition and management strategies to conserve stopover habitats used by songbirds as they travel through Pennsylvania during migration. National Weather Service Doppler Radar date and a Geographic Information System will be used to identify important stopover areas, and assess habitat and landscape features that affect which areas migrants use.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA, UPDE

MAMMALS

National

• **North American Bat Conservation Partnership -** Created to support continent-wide bat conservation efforts. It is an alliance of working groups, bat researchers, non-governmental organizations, and state and federal agencies from Mexico, Canada, and the United States. The plan is intended to provide the framework and direction for other local, state, and federal bat conservation and management plans.
Parks involved: ALL

• **Bat Population Status in the US and Territories (USGS) –** This project is intended to play an important catalytic role for the States, conservation organizations, and Interior land managers by developing information that provides a synthetic overview of bat status and trends nationally and regionally, allows hypothesis-testing, helps develop monitoring protocols, and summarizes information and conservation needs.
Parks involved: ALL

• **Southeastern Bat Diversity Network -** The Southeastern Bat Diversity Network was founded in 1995 at the NA Symposium on Bat Biology. Bat biologists, land managers and others interested in the conservation of bats that occur in the southeastern United States constitute the membership. The SBDN was formed to facilitate communication within the region, identify priorities and needs specific to the southeastern US and develop and implement programs that address regional bat conservation needs.
Parks involved: NERI, GARI and BLUE

State

• **Important Mammal Areas Project (PA) –** a voluntary program in Pennsylvania that identifies habitat of critical importance to mammals. To qualify as an IMA, the area must fit into one or more of the following categories: 1) supports diverse or unique communities of mammals, 2) supports high density populations of mammals, 3) supports mammals listed as endangered or threatened by Pennsylvania Biological Survey, 4) supports mammals that are declining or vulnerable nationally or listed as candidate species by the Pennsylvania Biological Survey, and 5) is important for public education about resident mammals.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA, UPDE

• **Terrestrial Mammal Survey/Species of Special Concern (PA Game Commission)** – Objective is to assess and monitor the distribution and relative abundance of Pennsylvania's terrestrial mammals of special concern. The primary species under investigations are the northern water shrew, rock vole and northern flying squirrel.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA, UPDE

• **Summer Bat Concentration Survey (PA Game Commission)** – Objectives are to determine and evaluate, via the Summer Bat Concentration database, of bat maternity colonies that use man-made structures, and to assess the nature and longevity of significant colonies (>300 bats) and to monitor proven and experimental bat boxes annually to assess

their efficacy in housing displaced (or new) maternity colonies. Results will be tracked using the PGC Batbox Database, updated annually.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA, UPDE

• **Indiana Bat Hibernacula Surveys (PA Game Commission)** – Objectives are 1) to assess the distribution of caves and mines used by bats, and to survey and monitor populations in these hibernacula 2) To monitor and protect all hibernacula harboring special concern species, 4 or more species, and/or large bat populations and 3) to prepare a technical overview of hibernacula research and management in Pennsylvania.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA, UPDE

• **Eastern Woodrat Surveys (PA Game Commission)** – Objectives are to complete an inventory of all potential woodrat habitats and inventory and analyze all known woodrat colony areas by 2005. Other objectives are to delineate the boundaries of woodrat metapopulations and to protect known woodrat colony areas and the surrounding, forested matrix from further habitat degradation.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA, UPDE

• **River Otter Restoration Project (NYSDEC)** – Partnership with the River Otter Project to restore this species to areas in western New York. Many individuals are tagged and monitored.
Parks involved: UPDE

• **Indiana Bat Surveys (NYSDEC)** – Effort to locate all Indiana bat summer and winter populations.
Parks involved: UPDE

• **Winter Bat Surveys (WV DNR)** – Surveys for hibernating endangered bats were conducted to examine population trends and to look for new sites. Surveys were conducted at 23 caves in 7 counties (2001). Endangered bat hibernaculua are surveyed every other winter.

• **Northern Flying Squirrel Monitoring Program (PA Game Commission)** – Currently in Wayne, Pike, Sullivan, Carbon, and Monroe counties. This project will continue to support a habitat study and state-wide monitoring program for the threatened northern flying squirrel in Pennsylvania. A monitoring program is continuing to be developed. Project cooperator is Wilkes University.

REPTILES AND AMPHIBIANS

National

• **North American Amphibian Monitoring Program (USGS)** – The NAAMP is a collaborative effort among regional partners, such as state natural resource agencies and nonprofit organizations, and the U.S. Geological Survey (USGS) to monitor populations of vocal amphibians.
Parks involved: ALL

• **Amphibian Research and Monitoring Initiative ARMI (USGS)** – Purpose of the program is to 1) provide the first nationwide assessment of the current distribution and status of amphibian populations; 2) Understand the scope and severity of amphibian declines; 3) determine the cause of declines and 4) provide essential scientific information to support effective management actions in order to arrest or reverse these declines. Extensive and necessarily coarse analyses are being carried out at the national level, while intensive research, geared towards population monitoring and research (including egg counts, population estimates, demographic studies, and other detailed population-scale work), is underway at a relatively small number of sites. The bulk of the analysis and reporting is targeted at identifying questions related to potential stressors, and whether additional data related to those stressors can and should be collected. Two projects include the status and trends of vernal pool salamanders as well as stream salamanders. Protocol development currently falls under eight categories: 1) amphibian monitoring, 2) stressors monitoring, 3) trend analysis and correlation, 4) population, landscape, and stressors modeling, 5) geographic information applications, 6) management decision support tools, 7) database management structure, input, and output, 8) metadata.
Parks involved: ALL

• **Environmental Monitoring and Assessment Program (EPA) –** The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources. EMAP aims to demonstrate multi-agency monitoring through large regional projects. The MAIA portion of the program concentrates on the Mid-Atlantic area. Projects include amphibian monitoring at sites within the region.
Parks involved: ALL

State

• **Pennsylvania Herpetological Atlas (IUP)** – Through Indiana University of Pennsylvania, this program gives the species distribution and threats to amphibians in Pennsylvania.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA, UPDE

• **New Jersey Herp Atlas (NJ ENSP) –** Atlas is nearly complete, gives species distributions from volunteer surveys throughout the state of New Jersey.
Parks involved: DEWA

• **West Virginia Herp Atlas (Marshall University)** – similar to other state programs.
Parks involved: NERI, GARI and BLUE

• **New Jersey Coverboard Mapping Project –** Right now, this project is only occurring on state park lands The program uses coverboards to monitor for terrestrial amphibians.
Parks involved: DEWA

• **New York Herp Atlas (NYSDEC)** – atlas completed for the state from 1990-1999. Gives a distribution of all herps within the state.
Parks involved: UPDE

FISH

National

• **Patrick Center for Environmental Research (PA)** - The Patrick Center Fisheries Section has expertise in stream, riverine and estuarine fish ecology, environmental impact assessment, biomonitoring, collection and identification of fishes (including ichthyoplankton), habitat and fisheries restoration, fisheries science, and analysis of fish contamination.
Parks involved: ALL

State

• **Environmental Assessment and Monitoring Program/Regional (EPA)** – a section of the EMAP program, addresses issues on a more local level. One project objective in West Virginia is to develop a fish IBI specific to the state's wadeable streams and small watersheds utilizing a probability-based design.
Parks involved: ALL

• **Fish IBI (NJ DEP) -** In order to assess environmental conditions on a larger spatial and temporal scale, the Bureau of Freshwater and Biological Monitoring began to supplement benthic macroinvertebrate monitoring with an index of biotic integrity (IBI) during the summer of 2000. As of December 2002 BFBM staff sampled fish assemblages at 55 sites in northern New Jersey. The BFBM plans to sample 45 more sites in northern New Jersey to establish a 100 site network.
Parks involved: DEWA

INVERTEBRATES

National

• **Environmental Assessment and Monitoring Program (EPA) –** The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources. EMAP aims to demonstrate multi-agency monitoring through large regional projects. The MAIA portion of the program concentrates on the Mid-Atlantic area. A streams monitoring program in the mid-Atlantic highlands uses biotic indices such as macroinvertebrates to determine stream health rather than water quality indices.

Parks involved: ALL

• **Patrick Center for Environmental Research (PA)** – Primarily a research organization, however, they have done extensive research on using macroinvertebrates as bioindicators. The Invertebrate Zoology section deals primarily with aquatic insect taxa and the Macroinvertebrates section, which is mainly concerned with non-insect macroinvertebrates taxa, such as gastropods and mollusks.
Parks involved: ALL

State

• **Integrated Biological Aquatics Assessment (NJ ENSP)** - conducts systematic, qualitative surveys for freshwater mussels, dragonflies and damselflies (*Odonata*) and stream-associated reptiles and amphibians (herptiles) at selected Ambient Biomonitoring Network (AMNET) locations throughout New Jersey. Sampling stations are in each subwatershed statewide.
Parks involved: DEWA

• **Freshwater Mussel Surveys (NJ ENSP) -** Since 1993, Program biologists have been conducting freshwater mussel surveys for rare species by targeting historic locations, suitable habitats and areas with host fishes present. As part of the Landscape Project, critical areas for freshwater mussels are now being mapped using criteria designed specifically for aquatic species.
Parks involved: DEWA

• **Stream Biomonitoring Unit (NYS DEC)** - Since 1972, the Stream Biomonitoring Unit of the New York State Department of Environmental Conservation has used aquatic macroinvertebrates to monitor the water quality of the State's rivers and streams.
Parks involved: UPDE

• **Statewide Surface Water Assessment (PA DEP)** – started in 1997, and expected to be complete by 2007. Developed to assess all 83,000 miles of streams in the state. Assessments are based on the instream habitat and macroinvertebrate community composition.

• **Surface Water Qulaity Monitoring Network (PA DEP)** – Biological samples are collected at 26 fixed stations three times a year and once a year at 123 additional stations using Rapid Bioassessment Protocols (EPA). These data, in conjunction with bimonthly water chemistry samples, are used to monitor long-term trends in water quality on the major streams in the state.

ALGAE

National

• **Patrick Center for Environmental Research (PA) –** the Phycology Section activities focus on ecology and taxonomy of freshwater algae, particularly diatoms. We seek to better understand the distributions of algal taxa throughout the U.S., and the environmental factors influencing both the occurrence of taxa over large scales and the composition of assemblages

at individual sites. We are particularly interested in applying knowledge of algal ecology to the assessment of a wide range of environmental issues, but primarily those related to water quality of rivers and streams.
Parks involved: ALL

PLANTS

State

- **NY Natural Heritage Program -** The New York Natural Heritage Program enables and enhances conservation of New York's rare animals, rare plants, and significant ecosystems. They conduct field inventories, scientific analyses, expert interpretation, and retain a comprehensive database on New York's distinctive biodiversity. Provide information for natural resources planning, protection, and management.
Parks involved: UPDE

- **West Virginia Natural Heritage Program –** The principle kinds of information maintained include: 1) Status and distribution of rare plant and animal species. This frequently involves the mapping of discrete populations and the evaluation of their quality and viability. About 700 species are monitored. 2) Location, description and condition of the state's wetlands. 3) Location and other data on significant natural communities such as shale barrens and caves. 4) Data on designated natural areas, public and private lands managed for natural values and nature preserves.
Parks involved: NERI, GARI, BLUE

- **PA Natural Heritage Program –** Cooperative effort between the Western Pennsylvania Conservancy, the Nature Conservancy and the PA DCNR. The Heritage Program conducts inventories and collects information about the biodiversity of the state.
Parks involved: ALPO, JOFL, FONE, FRHI, DEWA, UPDE

WETLANDS

National

- **National Wetlands Inventory (USFWS)** - The National Wetlands Inventory (NWI) of the U.S. Fish & Wildlife Service produces information on the characteristics, extent, and status of the Nation’s wetlands and deepwater habitats. The National Wetlands Inventory Center information is used by Federal, State, and local agencies, academic institutions, U.S. Congress, and the private sector. The NWIC has mapped 90 percent of the lower 48 states, and 35 percent of Alaska. About 47 percent of the lower 48 states, and 18 percent of Alaska are digitized. Congressional mandates require the NWIC to produce status and trends reports to Congress at ten-year intervals. In addition to status and trends reports, the NWIC has produced over 130 publications, including manuals, plant and hydric soils lists, field guides, posters, wall size resource maps, atlases, state reports, and numerous articles published in professional journals.

State

• **West Virginia Natural Heritage Program –** The principle kinds of information maintained includes the location, description and condition of the state's wetlands.
Parks involved: ALL

• **Vernal Pool Mapping Project (NJ ENSP) –** see description above (Water Resources).
Parks involved: DEWA

University

• **Cooperative Wetlands Center (Penn State) –** Research projects at the center include: 1) Developing and testing science-based methods and tools to assess and predict wetland functions, 2) Identifying and studying groups of reference wetlands and mitigation projects as a means of assessing ecological health and defining success and performance criteria for created wetlands, 3) Conducting landscape-level studies of the ecological integrity and restoration potential of wetlands in a watershed context, 4) Assessing and predicting habitat use by wetland-dependent wildlife, fish, and macroinvertebrates, 5) Focusing attention on priority topics and issues, such as ecological indicators, non-point- source pollution, habitat loss, reclamation of mined lands, and mitigation.
Parks involved: ALL

LAND USE CHANGE

National

• **Environmental Assessment and Monitoring Program (EPA) –** The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources. EMAP aims to demonstrate multi-agency monitoring through large regional projects. The MAIA portion of the program concentrates on the Mid-Atlantic area. Projects include monitoring changes in land cover and landuse throughout the region.
Parks involved: ALL

• **Environmental Indicators Initiative (EPA)** - EPA's Environmental Indicators Initiative improves the Agency's ability to report on the status of and trends in environmental conditions and their impacts on human health and the nation's natural resources. The Indicators Initiative also identifies where additional research, data quality improvements, and information are needed. EPA's long-term goal is to improve the indicators and data that are used to guide the Agency's strategic plans, priorities, performance reports, and decision-making.
Parks involved: ALL

• **Natural Resources Inventory (USDA-NRCS) -** The National Resources Inventory (NRI) is a statistical survey designed to help gauge natural resource status, conditions, and trends on the Nation's nonfederal land - nonfederal land includes privately owned lands,

tribal and trust lands, and lands controlled by State and local governments. The National Resources Inventory (NRI) was first conducted in 1977, and every 5 years thereafter through 1997.
Parks involved: ALL

• **Multi-Resolution Land Characteristics Consortium (MRLC)** – The MRLC is a partnership between the USGS, EPA, NOAA, USFS, NASA, and BLM. The consortium was formed in 1992 to efficiently acquire increasingly expensive satellite imagery for environmental monitoring programs.
Parks involved; All

• **National Land Cover Characterization Program (NLCD) MRLC –** The National Land Cover Characterization Program was started in 1995 to provide consistent and sophisticated land cover data across the entire nation and even internationally. The program's goals in addition to advancing land cover characterization methods and procedures, includes advancing conventional understandings of landscape transformation rates, cause and consequences.
Parks involved: ALL

• **Gap Analysis Program (GAP) MRLC –** Compiles current land use and land cover information along with predicted distributions of native terrestrial vertebrate species. With species specific habitats represented within their surrounding matrix of land covers and land uses, conservation scientists, policy makers and the pubic can make more informed biological resource management decisions at the local, state, regional and federal levels.
Parks involved: ALL

• **Land Cover Land Use Change (LCLUC) NASA** – The LCLUC is a NASA Earth Science Enterprise (ESE) initiative developed to better understand the consequences of current and future land use and land cover change. LCLUC scientists hope to achieve this by conducting repeated inventories, and modeling future scenarios based on existing interpretations of processes driving change. The LCLUC includes a human dimension of land use and land cover change by examining socioeconomic drivers where they are observed coincident with recent landscape change.
Parks involved: ALL

• **Geographic Analysis and Monitoring Program (GAM) USGS** – The GAM program was established in an attempt to "improve the understanding of the rates, causes and consequences of natural and human-induced processes that shape and change the landscape over time." (http://gam.usgs.gov/; August 26, 2004)
Parks involved: ALL

• **The National Map USGS** – The National Map program intends to provide a consistent framework for geographic data across the nation. It will also provide high-quality, high resolution geospatial data to the public and natural resource decision-makers.
Parks involved: ALL

• **US Census Bureau Geography Program** – The US Census Bureau Geography program provides mapping of demographic data along with base cartographic features related to urbanization and land use.
Parks involved: ALL

• **Chesapeake Bay Program Land Data Work Group** – This is a joint work group between the Monitoring and Assessment Subcommittee and the Land, Growth and Stewardship Subcommittee (LGSS). They're objectives are to classify land cover data, impervious surfaces and land use projections in order to predict pollutant loadings in waterways.
Parks involved: ALPO JOFL

FIRE

• **Eastern Fire Effects Research Team (USFS- Northeast) -** An informal team of Forest Service and affiliated scientists from the eastern United States that seek to collaboratively and efficiently answer wildland fire related questions.
Parks involved: ALL